N° 7265 A.D. 1895

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COMPLETE SPECIFICATION.

An Improved Melting and Reducing Furnace.

I, Rudolf Urbanitzky, of No. 9 Hofgasse, Linz-on-the-Danube, in the Empire of Austro-Hungary, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The improvements forming the subject of this invention relate to the melting and reducing furnace forming the subject of former Letters Patent No. 6965 of April 4, 1893; the end which these improvements are designed to attain being, to adapt the said furnace for use in obtaining aluminium.

With this object in view, it is proposed to make the inner chamber or shaft of the furnace so short as to leave only the portion provided with the basic lining, the mouth or orifice of which is closed by a lid or cover, which carries the positive electrodes together with their fittings or accessories. This lid like the lower or supporting plate, arranged at the lower orifice of the furnace has a current of water circulating in contact with, or through, it, and it is adapted to turn or oscillate backwards and forwards about its central vertical axis, whereby the entire surface of the molten metal, below the carbon electrodes, is subjected to the action of the flame-arc.

In the centre of the metal lid there is erected a vertical tube, surrounded by a cooling jacket and serving both to discharge the gases as they are evolved, and to admit the ores to be melted or reduced (or, where aluminium is to be obtained, to admit alumina).

The rocking or swinging motion, in alternate directions, may be imparted to the lid either by hand or in any other convenient manner,—by electricity, for example, a current, branching off the main or "working" current, being employed to set in motion a small auxiliary motor engine in the well-known manner;—and, similarly, the positive electrodes may be shifted or adjusted within their guides by hand or any other suitable means.

The construction of a melting and reducing furnace, in accordance with this invention, is illustrated in the accompanying drawing, in which

Figure 1 is a vertical section thereof, on the line x—x of Figure 2; and

Figure 2 is an horizontal section on the line y—y of Figure 1.

As shown, the improved furnace consists of a very short shaft or chamber, constructed of basic non-conducting material b^1, its bottom being formed of a wedge-shaped body c, of electrical carbon, which rests upon a plate c^1 of copper; which plate also carries the projection or stud d which serves for the attachment of the insulated cable e protected by the fire-clay pipe f. The copper plate c^1 is pressed by fire-clay blocks or wedges g against the bottom piece c, which is thereby forced into the furnace-shaft orifice.

The positive electrodes l, consisting of carbon bars arranged edgewise, are connected with the lid r by their guides p. The said lid r is supported by balls s located in a groove t, which is provided for the purpose in the plate r^1 arranged at the orifice of the shaft, the arrangement being such that the said lid may readily be turned about its central vertical axis.

The lid r is hollow, as are also the lower plate r^1 and guides p, all of which parts are constantly traversed by currents of cooling water.

In the centre of the lid r there is provided a vertical tube u which serves both for the discharge of the gases evolved in the course of the operation of the

[*Price* 8*d*.]

furnace, and for the admission into the latter of supplies of ore (or alumina, in the case of aluminium manufacture) to be melted or reduced; such tube being surrounded by a cooling jacket u^1.

This cooling jacket should preferably be connected with the hollow spaces of the guides *p*, lid *r* and plate r^1, so that one common cooling water supply pipe may serve to feed all these parts.

In the drawing, the lid *r* is shown as being connected with the lower plate by a flexible tube *w*, enabling the said lid to be swung round as before mentioned; while w^1 designates the narrow tubes connecting the cooling jacket u^1 with the hollow spaces within the guides *p*.

The communication of the hollow spaces of the said guides with the hollow space within the lid *r* is direct.

The cooling water is first conducted through the flexible or other tube into the cooling jacket u^1, whence it flows through the narrow tubes w^1 into the guides *p*, and thence into the lid *r* from which, through the flexible tube *w*, it passes into the lower plate r^1, whence it is eventually discharged.

As before stated, the lid may be reciprocated either by hand, or by suitable mechanical or electrical appliances; and the same remark applies to the carbon electrodes *l l* adjustable in their guides *p*.

To enable the lid and its attachments (*p* and *u*) to perform the above-mentioned reciprocating or alternate swinging motion, loosely suspended cables *v v* are provided, through which, with the assistance of brushes *h*, current is sent to the positive carbon electrodes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

(1.) A melting and reducing furnace specially adapted for use in obtaining aluminium, consisting of a short shaft or chamber, such as b^1, made of basic non-conducting material; the inlet orifice of such shaft being closed by a lid or cover, such as *r*, carrying the guides *p* for the radially arranged positive electrodes *l*; the said lid being adapted, for the purpose of utilizing the electrical flame-arc to better advantage, to be turned or swung backwards and forwards on its central vertical axis, and provided,—like the electrode-guides *p*,—with means for cooling it with water; and such furnace further consisting of a carbon block or body, such as *c*, forming the negative electrode and resting upon, or supported by, a metal plate, such as c^1, which, for the purpose of tightly closing the furnace-shaft, is forced into or against the bottom orifice of the furnace, by means of fire-clay blocks or wedges, such as *g*.

(2.) In a melting or reducing furnace of the class generically described in the first claim, the provision of a hollow plate, such as r^1; arranged to be cooled with water, and serving for supporting the lid *r*; such plate having a groove *t* formed in its upper side or surface, in which groove balls, such as *s*, are located, whereon the said lid *r* is arranged to rest, so that it may be readily reciprocated or swung in alternate directions.

(3.) In a melting and reducing furnace of the class referred to in the first claim, the provision on the lid *r* of a central tube, such as *u*, fitted with means for cooling it with water, and serving the double purpose of discharging the gases generated in the furnace and of admitting to the furnace the ores (or, in the case of aluminium manufacture, alumina) to be melted or reduced therein.

Dated this 9th day of April 1895.

HASELTINE, LAKE & Co.,
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(1 SHEET)

URBANITZKY'S Complete Specification.

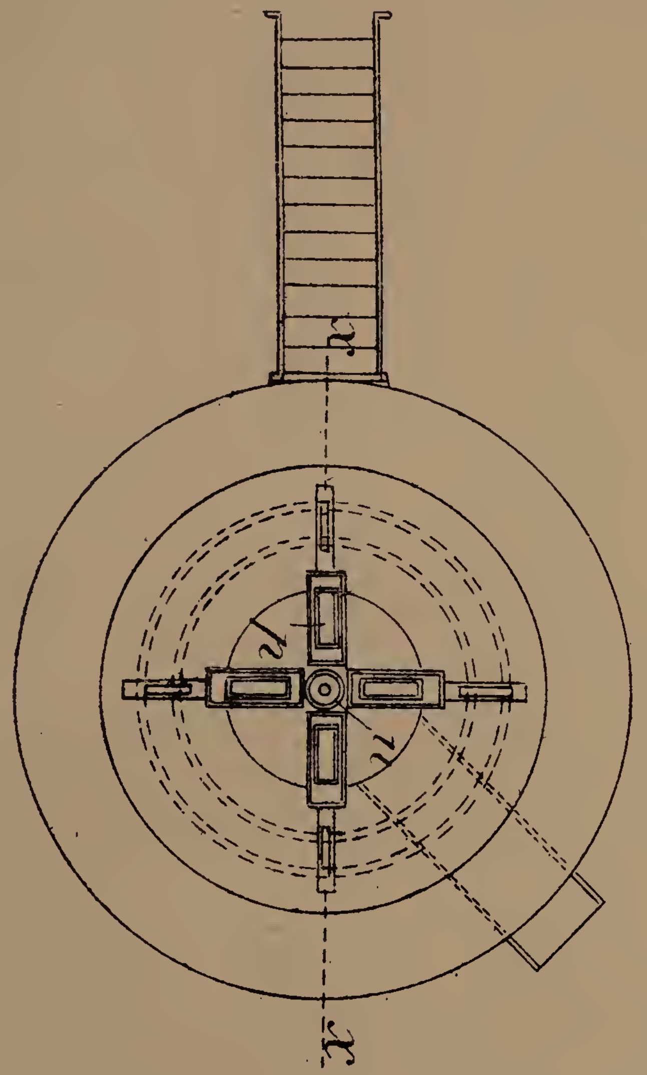

Fig. 2

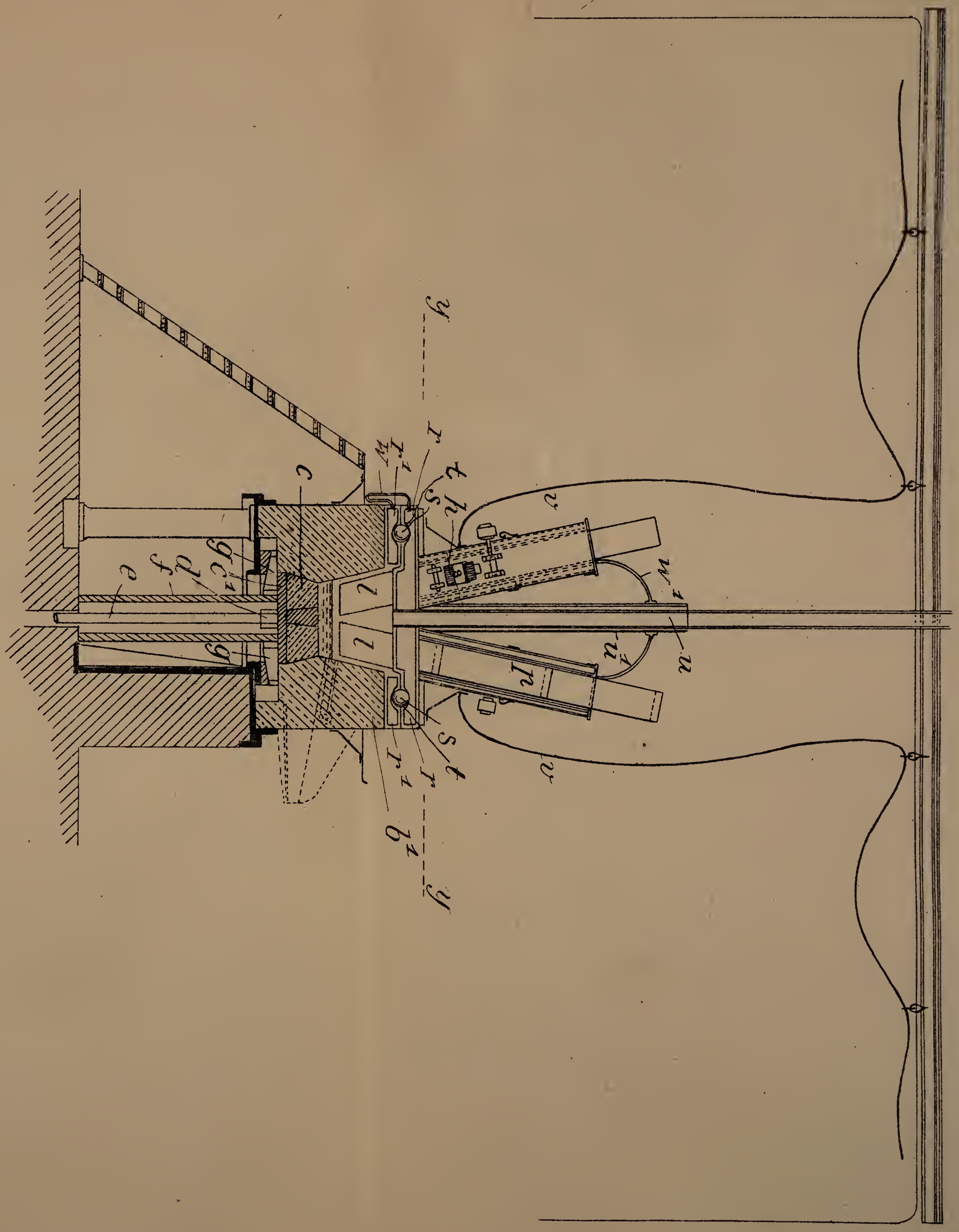

Fig. 1

[This Drawing is a reproduction of the Original on a reduced scale]

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